What is claimed is:

1. An implantable medical device, comprising:

a housing for containing electronic circuitry;

an antenna embedded in a dielectric compartment; and

circuitry within the housing connected to the antenna for transmitting and receiving a modulated radio-frequency carrier at a specified carrier frequency.

2. The device of claim 1 wherein the dielectric compartment is within a header for the device having feedthroughs therein for routing connections between internal circuitry and external leads.

3. The device of claim 1 wherein the dielectric compartment is a dielectric pocket adjacent a surface of the device housing.

4. The device of claim 1 wherein the dimensions of the antenna are such that a significant portion of radio-frequency energy delivered to the antenna at the specified carrier frequency is emitted as far-field radiation.

5. The device of claim 1 wherein the antenna is a helically coiled antenna.

6. The device of claim 5 wherein the helically coiled antenna is oriented roughly parallel to a surface of the device housing and further wherein the electrical length of the antenna is approximately one-half wavelength of the specified radio-frequency carrier.

7. The device of claim 5 wherein the helically coiled antenna is oriented roughly perpendicular to a surface of the device housing and further wherein the electrical length of the antenna is approximately one-quarter wavelength of the specified radio-frequency

carrier so as to act as a monopole antenna with the device housing serving as a ground plane.

8. The device of claim 5 further comprising an antenna tuning circuit for matching the impedance of the antenna to the transmitting/receiving circuitry at a specified carrier frequency by loading the antenna with inductance or capacitance.

9. The device of claim 8 wherein the tuning circuit comprises a variable tuning capacitor for adjusting the resonant frequency of the antenna.

10. The device of claim 9 wherein the tuning circuit further comprises a balun transformer for converting between a single-ended signal generated or received by the transmitter/receiver circuitry and a differential signal generated or received by the antenna.

11. The device of claim 10 wherein a winding of the balun transformer is formed by the helical antenna.

12. The device of claim 1 wherein the device is a cardiac rhythm management device having rhythm control circuitry electrically connected to one or more electrodes adapted for disposition within or near the heart by one or more therapy leads.

13. The device of claim 12 wherein the helical antenna is embedded within a header of the device coiled around a bore into which an end of a therapy lead is inserted.

14. A method for transmitting and receiving radio-frequency signals in an implantable medical device, comprising:

transmitting or receiving a modulated radio-frequency carrier at a specified carrier frequency to or from an antenna embedded within a dielectric compartment of the device; and,

matching the impedance of the antenna to the transmitting/receiving circuitry at a specified carrier frequency by loading the antenna with inductance or capacitance using an antenna tuning circuit, wherein a significant portion of radio-frequency energy delivered to the antenna at the specified frequency as far-field radiation.

15. The method of claim 14 further comprising converting between a single-ended signal generated or received by the transmitter/receiver circuitry and a differential signal generated or received by the antenna with a balun transformer.

16. The method of claim 15 further comprising adjusting the resonant frequency of the antenna to a specified carrier frequency with a variable capacitor.

17. The method of claim 14 wherein the antenna is a helically coiled antenna.

18. The method of claim 17 wherein the helically coiled antenna is oriented roughly parallel to a surface of the device housing and further comprising transmitting at a carrier frequency with a wavelength approximately twice the electrical length of the antenna.

19. The method of claim 17 wherein the helically coiled antenna is oriented roughly perpendicular to a surface of the device housing and further comprising transmitting at a carrier frequency with a wavelength approximately four times the electrical length of the antenna such that the antenna acts as a monopole antenna with the device housing serving as a ground plane.

20. The method of claim 17 further comprising converting between a single-ended signal generated or received by the transmitter/receiver circuitry and a differential signal generated or received by the antenna with a balun transformer and wherein one winding of the transformer is formed by the helical antenna.